DOCUMENT RESUME

ED 147 650 CE 014 264

AUTHOR	Kenel, Francis C.
TITLE	Personality Factors and the Driving Task.
INSTITUTION	Highway Users Federation for Safety and Mobility, Washington, D. C.
SPONS AGENCY	Automotive Safety Foundation, Washington, D.C.
PUB DATE	Jan 71
NOTE	22p.; ADTSEA, 1201 16th Street, N.W., Washington, D.C., 20036 ($0.20; over 100, $0.10)
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	Behavioral Science Research; *Behavior Patterns; Behavior Rating Scales; Behavior Standards; Behavior Theories; *Driver Education; *Individual Characteristics; Psychological Characteristics; Secondary Education; Student Behavior; Student Characteristics; *Traffic Safety
IDENTIFIERS	Mann Inventory

ABSTRACT

This booklet reviews several research studies in light of the possibility of identifying certain behavioral characteristics and the relationship of the characteristics to vehicle operator performance. Focus is on implications for driver education. A short introductory section describes the development of the Mann Inventory for categorizing behaviors, which was used in all the studies. The major section presents a description and report of the research findings employing the Mann Inventory relative to three areas of investigation: (1) relationship of observed behavior to Inventory responses, and an investigation of driving behavior related to behavioral categories; (2) behavioral characteristics associated with seat belt utilization; and (3) correlation of visual perceptual abilities and behavioral characteristics as measured by the Mann Inventory. Implications discussed include the question of the ability of teachers to classify individuals into behavioral categories, and the need for special programs to be provided for students who exhibit behavior that is either aggressive, withdrawn, or vacillates between the two. A list of references is provided. (BL)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED147650

DRIVER AND TRAFFIC SAFETY
EDUCATION RESEARCH DIGEST

"PERSONALITY FACTORS AND THE DRIVING TASK"

"PERMISSION TO REPRODUCE THIS MATERIAL BY MICROFICHE ONLY HAS BEEN GRANTED BY

ADTSEA

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND THE ERIC SYSTEM CONTRACTORS"

U S DEPARTMENT OF HEALTH EDUCATION & WELFARE NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Published by

HIGHWAY USERS FEDERATION
FOR SAFETY AND MOBILITY

1776 Massachusetts Ave., N.W.
Washington, D.C. 20036

CE 014 264

Highway Users Federation for
Safety and Mobility
Washington, D.C.

January, 1971

This Publication has been produced with the financial assistance of the Automotive Safety Foundation. Work in connection with its development and distribution was carried forward by the professional staff of the Highway Users Federation for Safety and Mobility.

PREFACE

The intent of the RESEARCH DIGEST is to disseminate research pertaining to driver and traffic safety education. Our main sources are theses submitted toward graduate degrees. We feel the DIGEST will be of educational value to high school driver education teachers and will assist them professionally and in a practical manner. An attempt has been made to make the material understandable to the non-research oriented teacher.

Driver education teachers have always considered personality, attitudes and emotions as having a significant influence on an individual's ability to deal with the driving task. This DIGEST discusses the possibility of identifying certain behavioral characteristics and the relationship of these characteristics to vehicle operator performance. The ability of an individual teacher to identify these variations in behavior is also discussed.

This report, the second in a series of three, was written by Francis C. Kenel, Ed.D., Associate Professor, University of Maryland.

ALLEN ROBINSON
Highway Safety Specialist
Highway Safety Division
Highway Users Federation
for Safety and Mobility

CONTENTS

	Page
INTRODUCTION	1
I. DESCRIPTION AND DEVELOPMENT OF THE MANN INVENTORY	3
II. REVIEW OF RESEARCH STUDIES	6
Relationship of Observed Behavior to Inventory Responses and an Investigation of Driving Behavior Related to Behavioral Categories	6
Relationship Between Behavioral Characteristics and Driving Records	8
Behavioral Characteristics Associated With Seat Belt Utilization	10
Correlation of Visual Perceptual Abilities and Behavioral Characteristics as Measured by the Mann Inventory	11
III. IMPLICATIONS	13
REFERENCES	16

INTRODUCTION

A REVIEW of literature, including studies of the Old Testament and mythology, reveals that man has been attempting for centuries to explain why some individuals seem accident prone. This search for an explanation has ranged from the concept of calling an accident an "Act of God," to simple data collection of observable physical evidence, to the identification of unsafe behavior as a primary factor in accident causation.

More recently, the areas of personality variables, attitudes and the quality of personal adjustment, including problem drinking, have been emphasized as important factors in accident involvement. In this light, an especially promising approach applied to highway accidents might be summarized by the thought, "We drive as we live, and high accident rates may reflect our patterns of adjustments to modern life." (13).

If we discount the fact that much of the early research in the field of accident prevention was conducted to prove or disprove the accident proneness concept and concentrate instead on psychological characteristics and social adjustment, we find that studies reveal a consistent pattern of digression from accepted norms of behavior among accident involvees. This concept is supported by the works of a number of persons. (4) (1) (22) (21) (2)

If, in fact, we accept accidents as a form of human behavior, a promising conceptualization of the accident phenomenon appears to lie in the behavioral or adjustive approach involving both psychological and social factors. Work with "The Psychological Inventory" and "Personal Data" by Hanner (8) (9), "Personal Data"

by Schuster and Gilford (18), "The Thematic Apperception Test" plus the "Social Responsibility Test" by Shaw (19), and the "Mann Inventory" by Kenel (10) and others appears to give credence to this approach. This report will deal with the development, administration, findings and implications for the use of the "Mann Inventory" with selected driving publics.

SECTION ONE

Description and Development of The Mann Inventory

THE MANN INVENTORY consists of 63 items that reflect an individual's feelings toward himself, others and established mores. Reaction to items in the Inventory are expressed by checking one of five responses: always, usually, sometimes, rarely and never.

The Mann Inventory in its original form consisted of 100 items selected by Dr. William Mann of the Highway Traffic Safety Center at Michigan State University. The items represented a compilation of the feelings expressed by 100 Michigan high school students toward police, schools, cars, family, peers and society as a whole as well as personal expectations, desires and habits. Intensive case studies, including personal interviews, were conducted with each of the 100 students after driver education teachers identified them as the "worst drivers" in their respective schools.

A pilot study to select differentiating questions from among the list of 100 items was conducted with the assistance of 20 central Michigan high school driver education teachers who were requested to evaluate students enrolled in their classes. Prior to administering the questions, the teachers were brought together and criteria were established for the identification of three behavioral categories:

(1) very aggressive

(2) very reserved

(3) average

The criteria for evaluation were as follows:

(1) *Very Aggressive:* Any student who, in the opinion of the driver education instructor through personal observation in the classroom and/or during practice driving instruction, displays behavior that is exceedingly aggressive, is a "show-off," or is extremely egotistical or temperamental.

(2) *Very Reserved:* Any student who, in the opinion of the driver education instructor through personal observation in the classroom and/or during practice driving instruction, displays behavior that is exceedingly cautious and timid.

(3) *Average:* All students who do not fall into either of the other classifications.

The 100 items were then administered to a sample population of 451 students. Results identified 80 students as "very aggressive," 86 as "very reserved" and 285 as "average." Responses to each of the items were tabulated for each of the three categories, and significant differences determined. The results of this analysis disclosed that 18 items appeared to differentiate between the three categories. A total of 37 items were deleted since nearly all students gave identical responses. The 63 items that were retained were edited and these items make up the instrument now identified as the Mann Inventory.

The Mann Inventory was subsequently administered to 42 persons who had been referred to the Ingham County Driver Safety School, Lansing, Michigan, after having been found guilty of at least two moving violation and/or involved in two collisions within the preceding 12 months. Using the criteria pre-

viously established, 15 persons were identified as "very reserved," 21 as "very aggressive" and four as "average." The other two persons compiled scores indicating vacillation from "marked aggressive" to "very reserved."

On the basis of this and other work by Kenel, it appeared that more behavioral categories were required than were employed in the initial efforts. As a result, six categories of observable behavior were established:

(1) Behavior characterized by well adjusted interaction with persons and consistent with the norms of the society in which the individual lives.

(2) Behavior generally characterized by satisfactory interaction with persons and society, but with periodic withdrawal from contact with people.

(3) Behavior generally characterized by satisfactory interaction with persons and society, but with periodic efforts toward assertive action.

(4) Behavior characterized by forceful, outgoing action or vigorous efforts to assert oneself over others.

(5) Behavior characterized by withdrawal from contact with other persons.

(6) Behavior characterized by a pendulum effect, vacillating between extremes of aggression and withdrawal.

It is in this form that the Mann Inventory was employed in the studies reviewed in this publication.

SECTION TWO

Review of Research Studies

THIS SECTION includes a description and report of the research findings employing the Mann Inventory relative to three areas of investigation:

—*Relationship of observed behavior to Inventory responses, and an investigation of driving behavior related to behavioral categories.*

—*Behavioral characteristics associated with seat belt utilization.*

—*Correlation of visual perceptual abilities and behavioral characteristics as measured by the Mann Inventory.*

Relationship of Observed Behavior to Inventory Responses and an Investigation of Driving Behavior Related to Behavioral Categories

The first extensive study undertaken to determine the significant relationships between observed behavior, driving records and behavioral category as determined by the Mann Inventory was conducted by Kenel, assisted by Gutshall.

The sample population of this study consisted of 1,057 subjects (523 males and 534 females) between the ages of 16 and 18 years enrolled in driver education at Sexton High School, Lansing, Michigan, between September 1958 and June 1960.

With an enrollment of approximately 2,000 students in grades 10 through 12, Sexton High School afforded a comprehensive cross section of the ethnic and socio-economic groups of the city of Lansing and the surrounding rural areas.

The driver education policy at Sexton was to assign students to one of the two instructors for the total instructional program with classroom, multiple-car and on-street instruction taking place as integrated learning experiences over an 18 week semester. This system provided each instructor with greater opportunity to become closely acquainted with students and to evaluate their behavior than is typically true in programs of comparable size.

This type of program also helped to overcome one of the potential weaknesses of the original "Mann Inventory" in that the evaluation of student behavior was limited to two instructors, in contrast to the 25 persons involved in the initial data collection.

In addition, both instructors had earned Masters Degrees in Traffic and Safety Education with emphasis in the behavioral sciences and had completed course work for a Doctorate in the fields of Traffic Accident Prevention and Special Education, respectively. Each had several years of teaching experience at the junior high, secondary and college levels, and each had three years' experience conducting driver improvement sessions for chronic violators for Ingham County Driver Safety School.

The behavior of students was observed for a minimum of one semester while they were enrolled in driver education and continued less formally throughout the two years of the study. When conflicting information or observations led to doubts about a student's basic behavioral pattern, consultation was held with the school counselor and other members of the school staff and/or reference was made to the student's permanent record.

The Mann Inventory, lasting 20 minutes, was administered to each student during the last week of the driver education course. After evaluation of the observed behavior of an individual, each response sheet was placed in one

of the six behavioral categories, with each category being further divided on the basis of sex. Early in 1965, after an elapsed time of 30 months, the individual driving records—convictions and/or collisions—were obtained from the driver record file of the Lansing Police Department.

When the responses to individual items in the Inventory were analyzed by behavioral categories (1 through 6) for the combined male and female population, 60 of the 65 items were found to be significant. An analysis of responses to individual items by sex revealed that 37 items differentiated between females in the various categories, while 47 items differentiated between males. Further analysis revealed that responses to 20 to 39 items were significantly related to one or the other of the six behavioral categories.

A review of individual driving records disclosed that 73, 74 and 62.5 percent of the individuals in behavioral categories 1, 2 and 3, respectively, had records free of convictions and/or collisions during the 30 months immediately following receipt of their driver's licenses. In contrast, 82.5, 62 and 88 percent of those persons in behavioral groups 4, 5 and 6 had a record of convictions and/or collisions during the same time period.

Further analysis revealed that 19.3 percent of the persons in categories 1, 2 and 3 had been convicted of moving violations, while 12 percent had been involved in reported collisions. In contrast, 65 percent of the persons in categories 4, 5 and 6 had been convicted of moving violations and 52 percent had been involved in reported collisions.

Relationship Between Behavioral Characteristics and Driving Records

Guyer (6) has made a more recent attempt to determine the relationship between behavioral characteristics as identified by the Mann

Inventory and the driving records of a sample population of college students. His sample population of 200 was drawn in equal numbers from Dartmouth College and Illinois State University. All of the students at both institutions were enrolled in a general psychology course, were primarily sophomores and had reached a mean age of 20.6 years. At the time the test was administered, each student was also requested to indicate the quality of his driving experience during the past three years as measured by convictions or collision involvements. Analysis of the results revealed:

—33 percent with a clean driving record (no convictions or collisions);

—20 percent reported having been involved in one or more collisions, but indicated no convictions for moving violations;

—21 percent reported having been convicted of moving violations, but never having been involved in a collision as a driver; and

—17 percent reported having a record of convictions for moving violations and collision involvement.

Significant differences were identified when collision and non-collision involvement were analyzed by behavioral categories. [illegible]t, 80 and 70 percent, respectively, of persons in categories 4 and 6 were found to have been involved in collisions within the past three years. This is in contrast to an involvement of approximately 43 percent for categories 1, 2 and 3. The lowest collision involvement in this case, however, was reported by persons falling into behavioral category 5, where only one person of eight reported any accident involvement.

Behavioral Characteristics Associated With Seat Belt Utilization

Studies on the effectiveness of restraining devices (seat belts and shoulder harness) have consistently proved their value in reducing the number and severity of automobile collision injuries. Research has also demonstrated a persistent failure or refusal on the part of the general public to use restraining devices, with the general level of usage rarely exceeding 33 percent. A profile of individuals who are most likely to use seat belts has evolved. Restraining device users can be described as follows: (a) male; (b) 25 to 35 years old; (c) married; (d) college educated; and (e) driving a vehicle of 1964 model year or later.

On the basis of this criteria, Rodolf (17) administered the Mann Inventory to groups of male graduate students representing nearly every department in each of the colleges at Illinois State University. His sample population consisted of 444 male graduate students, with an average age of 29.2 years (ranging from 20 to 60 years), 96 percent of whom operated motor vehicles equipped with restraining devices.

Analysis revealed behavioral categories identified by the Mann Inventory showed substantial differences in frequency of restraining device use. Table 3, page 47, of Rodolfs' study best illustrates the findings.

Analysis of the table indicates that 32.7 to 40 percent of the persons in categories 1, 2 and 3 report using restraining devices 85 to 100 percent of the time. In contrast, 37 percent of the persons in categories 4 and 5 report *never* using seat belts, while 32 to 52 percent of persons in categories 4, 5 and 6 report using seat belts less than 20 percent of the time.

Individuals were also asked if they supported compulsory seat belt usage legislation and if they

request their passengers to use seat belts. Responses produced similar findings: persons in categories 4, 5 and 6 replied most strongly in the negative; persons in category 1 favored compulsory seat belt usage legislation most strongly, with categories 2 and 3 primarily undecided. However, those in category 3 appear most likely to request or suggest that passengers use seat belts, followed by persons in categories 1 and 2.

Correlation of Visual Perceptual Abilities and Behavioral Characteristics as Measured by the Mann Inventory

Visual perceptual ability—or the quality of what one perceives in response to visual stimulus—represents another field of inquiry into the psychological processes bearing on man's accident involvement. Bloomer (3) treats the psychological process related to seeing as "Perceptual Vigilance" and "Perceptual Defense" or, more simply stated, "people see what they want to see."

Since the work of Spicer (20) and others has tended to support the position that the quality of perception is a factor related to accident involvement, a reasonable question exists as to the relationship between visual perceptual ability and behavioral characteristics.

Independent studies investigating the relationship between visual perception and behavior were undertaken by Goby (5), Lazarewicz (11) and Quane (16). Each of the investigators employed the Mann Inventory and the "Perception of Traffic Hazards Test" (14) in their collection of data.

The sample populations selected by Lazarewicz and Quane were similar in that they were primarily made up of students from urban-

suburban communities. Lazarewicz selected his population from students enrolled in driver education in schools located in northwest Cook County, Illinois, while Quane's population was drawn from among driver education students in Lansing and East Lansing, Michigan. However, one difference did exist in that Quane's sample population included students from an intercity environment. Approaching the question from a somewhat different tact, Goby selected a population sample consisting largely of students from rural areas in mid-Illinois.

Analysis of data in these studies did not indicate significant differences in scores on the "Perception of Traffic Hazards Test," when compared to behavioral categories as determined by the Mann Inventory. However, in the discussion of his findings, Quane states:

> "While not at a significant level, subjects who exhibited withdrawal tendencies (categories 2 and 5) tended to over-react to the visual stimuli presented and seemed to see things which were not present. The mean of the total negative scores on the "Perception Test" of categories 2 and 5 were 6.60 and 7.96, respectively, as compared to the means of categories 3 and 4 (aggressive tendencies) which were 6.22 and 5.88, respectively. It might be surmised that the individuals in categories 2 and 5 may have experienced more anxiety about the test due to past problems of performance in school, and having a strong desire to perform well would tend to make more incorrect responses."

SECTION THREE

Implications

An important finding arising out of all of the studies reviewed is the possibility of identifying certain behavioral characteristics and the relationship of these characteristics to vehicle operator performance. Equally important, however, is the question of the ability of the individual teacher to identify these variations in behavior. Kenel, in testing the reliability of the Mann Inventory, reports:

> "Raters with comparable professional experience, classifying individuals independently, on the basis of established criteria can arrive at essentially the same categorization."

In an interview, Quane reported an extremely high level of agreement when teachers were asked to react to the specific behavioral classification of students as determined by the Mann Inventory. In short, it is possible to assume that either as a result of professional preparation or through the use of written tests of one type or another, teachers can reasonably be expected to properly classify individuals into behavioral categories.

The importance of identifying persons in this manner is aptly stated by Rodolf:

> "If drivers can be identified on the basis of behavioral categories associated with failure to utilize restraining devices, then those concerned with the motivation of non-seat belt users can concentrate efforts and apply techniques toward changing their behavior."

Kenel further attests to this point in his conclusions:

"A highly significant relationship exists between observed behavior in driver education and driving records as attested to by the absence or presence of convictions for traffic offenses and/or collisions."

If we accept these conclusions, it would appear that special programs should be provided for students who exhibit behavior that is either aggressive, withdrawn or vacillates between these two extremes. The degree to which an individual teacher, counselor or driver improvement specialist can or should attempt to work with individuals who exhibit adjustment problems depends on a number of variables. Among these variables are the availability of professionally trained staff, relationship with the individual, and, in the case of the classroom teacher, the assigned teaching load. A factor of singular importance may be the number of individuals involved, for in each of the studies reviewed about 15 to 18 percent of the population was identified as exhibiting adjustment problems.

It may be reasonable to assume that an interested teacher who has identified one or two individuals exhibiting rather severe behavioral problems may be able to assist those individuals in resolving their problems. However, it is not reasonable to expect that an instructor, teaching five or six classes of 24 to 36 students daily, will be able to assist any large number of persons to resolve problems of adjustment. In such circumstances—or when dealing with chronic traffic offenders—small group therapy sessions conducted by trained staff might well be initiated. Such an approach is suggested and guidelines provided by Myrick (15), and Mann (22), respectively, in "A Manual for Instructors Conducting Discussions on Driver Attitudes," and "Let's Talk It Over."

An approach similar to those suggested by these authors was employed for three years in the Ingham County Driver Safety School in Lansing, Michigan. The program, consisting of five two-hour sessions, was limited to 12 persons. The emphasis was placed on group interaction in an attempt to assist the individual to gain greater understanding of his basic behavior, as well as to the types of incidents that appeared to trigger non-socially acceptable behavior.

A follow-up study, conducted at the end of the three years, indicated that persons who exhibited either marked aggression or withdrawal behavior appeared to show substantial improvement in their driving records. However, persons whose behavior vacillated between the extremes of aggression and withdrawal seemed to improve much less, and it may be assumed that they needed much more individual attention than could be provided even under the conditions described.

The Mann Inventory and other instruments used to identify behavior related to motor vehicle operation seems to be fairly well established for the populations tested and particularly within the 16 to 28-year-old group. However, it is equally apparent, as is true of any man-machine system, that numerous factors can contribute to failure within the system. Hence, even with 100 percent effectiveness in the identification of behavioral problems, failures will continue in the highway-vehicle-operator interaction. Therefore, the use of the Mann Inventory or similar tests is limited to assisting the individual to become a more effective system user.

REFERENCES

1. Alexander, F. *Psychosomatic Medicine* as quoted by L. LeShan, "Dynamics in Accident-Prone Behavior," *Psychiatry*, 1952.

2. Birnbach, B. S. "A Comparative Study of Accident Repeater and Accident-Free Pupils." Unpublished Doctoral Dissertation, New York University, 1947.

3. Bloomer, R. H. "Perceptual Defense and Vigilance and Driving Safety." Reprint of *Traffic Quartrely*, October, 1962.

4. Dunbar, F. *Synopsis of Psychosomatic Diagnosis and Treatment* as quoted by L. LeShan, "Dynamics in Accident-Prone Behavior," *Psychiatry*, 1952.

5. Goby, D. W. "The Relationship Between Visual Perceptual Abilities and Behavioral Categories Among Beginning Motorists," Unpublished Master's Thesis, Illinois State University, 1970.

6. Guyer, R. M. "Driver Propensities and Driving Records." Unpublished Master's Thesis, Illinois State University, 1970.

7. Haddon, W., E. Suchman and D. Klein. *Accident Research Methods and Approaches*. New York: Harper and Row Publishers, 1964.

8. Hanner, C. P. "Use of Personal Data in Underwriting Setting," *Traffic Safety Research Review*, National Safety Council, VII, 3 (September, 1963).

9. Hanner, C. P. "Use of Psychological Inventory in Writing Insurance for Youthful Male Drivers," *Traffic Safety Research Review*, National Safety Council, VII, 1 (March, 1963).

10. Kenel, F. C. "The Effectiveness of the Mann Inventory in Classifying Young Drivers Into Behavioral Categories and Its Relationship to Subsequent Driver Performance." Unpublished Doctoral Dissertation, Michigan State University, 1967.

11. Lazarewicz, R. S. "The Relationship Between Behavioral Characteristics and Visual Perception." Unpublished Master's Thesis, Illinois State University, 1970.

12. Mann, W. "Let's Talk It Over," *Analogy*, Charter Issue, Allstate Insurance Company, 1966.

13. McFarland, R. A. *The Major Strategies in the Prevention of Highway Injuries and Fatalities*. Harvard School of Public Health.

14. McPherson, K. and T. Cooper. *The Perception of Traffic Hazards Test*. Unpublished.

15. Myrick, R., L. Schlesinger and B. Marx. *A Manual for Instructors Conducting Discussions on Driver Attitudes*. The George Washington University, November 1962.

16. Quane, W. L. "The Relationship of Visual Perceptual Capabilities as Measured by the Perception of Traffic Hazards Test and Behavioral Categories as Measured by the Mann Inventory." Unpublished Doctoral Dissertation, Michigan State University, 1970.

17. Rodolf, J. D. "Behavioral Characteristics Associated With Seat Belt Utilization." Unpublished Master's Thesis, Illinois State University, 1969.

18. Schuster, B. H. and J. P. Guilford. *An Analysis of Accident Repeater and Chronic Violator Drivers.* A paper presented at the 47th National Safety Congress and Exposition. Chicago, Illinois, October, 1959.

19. Shaw, L. "The Practical Use of Projective Personality Tests as Accident Predictors," *Traffic Safety Research Review*, IX, 2, (June, 1965).

20. Spicer, R. A. *Human Factors in Traffic Accidents*, Department of Health, State of Hawaii, 1964.

21. Tillman, W. A. and G. E. Hobbs. "The Accident Prone Automobile Driver," A Study of Psychiatric and Social Background, *American Journal of Psychiatry*, CVI, 5. (1949).

22. Wong, W. A. and G. E. Hobbs. "Personal Factors in Industrial Accidents," *Industrial Medicine and Surgery*, XVIII (July, 1949).